SACRAMENTO METROPOLITAN FIRE PROTECTION DISTRICT

Operations Division

Hose Specification

5”

Nitrile Rubber Supply hose

SACRAMENTO METROPOLITAN FIRE DISTRICT
FIRE HOSE SPECIFICATION 5 - INCH

SCOPE OF WORK/SPECIFICATIONS:

Quality: The fire hose to be supplied under this specification is a premium quality, double jacket municipal fire hose. All materials used in the fabrication of the hose shall be of the best quality, commercially available.

Service Life: The fire hose furnished under the terms of this proposal has a potential service life of 10 years, barring mistreatment or accidental damage that would render the hose unfit for service. Upon delivery, the fire hose shall be in first-class condition free from defects in workmanship and materials. The supplier shall provide replacement of any such hose as may be defective without any charge whatsoever to the Sacramento Metropolitan Fire.

TECHNICAL INFORMATION

Quality Assurance: The manufacturer must be committed to a Total Quality Management program designed to meet **ISO International Standard 9002 (1987 E.).** Quality Management procedures shall regulate twisting of yarns, weaving of jackets, extruding of linings, coating of outer jacket, vulcanizing and coupling of hose, and physical and laboratory testing of all raw materials and finished hose. The manufacturer shall maintain current calibrations on all test apparatus traceable to the National Institute of Standards and Technology (NIST). No exceptions are to be allowed. All hose shall be UL tested and listed. All listings shall be available upon request to the bidder.

NFPA Standard: The hose must meet all the requirements of **NFPA 1961**, *Standard on Fire Hose (Latest Edition).*

1. HOSE CONSTRUCTION

Hose meeting this specification shall consist of a 100% synthetic high tensile yarn reinforcement circular woven in a “twill configuration” to maximize hose flexibility and eliminate any left hand twist.

The woven reinforcement shall be totally encased in a matrix of ozone resistant nitrile rubber utilizing a single through the weave extrusion process, thereby eliminating the possibility of delaminating found in layered hoses.
The unitized finished product shall thereby optimize hydrostatic properties, abrasion resistance and rubber to yarn adhesion.

2. LINING AND COVER PROPERTIES

When tested in accordance with the procedures listed in **NFPA 1961**, *Standard on Fire Hose (Latest Edition)* and other related standards. Test reports shall be provided to The District upon request. All hose shall be U.L. tested and listed. All hose shall have the following properties listed.

ULTIMATE TENSILE STRENGTH: Tensile strength of lining and cover rubber compound shall not be less than 1750 psi.

ULTIMATE ELONGATION: Ultimate elongation of liner and cover shall not be less than 500%.

PERMANENT ELONGATION: Permanent elongation of liner shall not be greater than 25%.

ACCELERATED AGING TEST: When using conditions as listed in ASTM D 1349-87, samples of the vulcanized rubber compound subjected to air oven aging at 100 degrees C for 70+/-1/2 HR, and than tested in accordance with ASTM D573-88 will exhibit a tensile strength of not less than 80% of the unaged sample. The ultimate elongation shall be not less than 50% of the original value.

ADHESION: Adhesion between reinforcement and either cover or liner shall be a minimum of 22-1/2 lbs when tested using **NFPA 1962, "**current addition" procedure. (Note: That weight exceeds NFPA minimum requirement)

OZONE RESISTANCE: Ozone resistance has been determined critical to long term safety; therefore, hose shall no visible signs of cracking of the lining or cover when tested in accordance with ASTM D 1149-91 and ASTM D518-86 (current edition) procedure B.

CHALKING: Hose furnished to this specification shall not react to environmental changes or chalking caused by exposure to sunlight or heat.

CHEMICAL RESISTANCE: Exposure to sea water and contamination by most chemical substances, hydrocarbons, oils, alkalis, acids, and greases must have no effect on the short or long term performance of the hose. The manufacturer must provide standard chemical resistance charts.

3. SAFETY FACTORS

ABRASION RESISTANCE SAFETY FACTORS: Abrasion resistance bears a direct relationship to the safe performance of the hose on the fire ground and as such will not be compromised. The U.L. (Underwriters Laboratories) reciprocation test – listed first – is felt to most closely reproduce this Fire Districts actual fire ground conditions and is therefore considered of prime importance to the purchasing authority. Hose meeting all the abrasion resistance safety factors listed below shall do so without exceeding the average weights listed in this specification.

SAFETY FACTOR TO DAMAGE – U.L. Reciprocating test. Hose shall withstand 5,000 Cycles on a reciprocating abrasion tester- as specified in U.L. standard number 19- resulting in no delamination or damage to the reinforcing yarns.

SAFETY FACTOR TO EXPOSURE - TABER TEST. Hose shall withstand 18,000 cycles on the taber abrasion machine with H22 wheels, 1,000 GM total load per wheel, 2,000 GM total, without damage to the synthetic reinforcement fibers. Tests to be performed in accordance with ASTM D3389-87. Wheels must be refaced immediately prior to commencement of test.

COLD RESISTANCE SAFETY FACTOR. Cold resistance bears a direct relationship to the safe performance of the hose an the fire ground and such will not be compromised. Hose meeting the cold resistance safety factors listed below shall do so without exceeding the average weights listed.
Hose shall have a capability of safe use down to –50 degrees F. Hose shall be tested in accordance with **NFPA 1961**, *Standard on Fire Hose (Latest Edition).*

HEAT RESISTANCE SAFETY FACTOR. Heat resistance bears a direct relationship to the safe performance of the hose and the fire ground and such will not be compromised. Hose meeting the heat resistance safety factors listed below shall do so without exceeding the weights listed.
The hose, when subjected to a static pressure of 100 psi shall be capable of safely withstanding a surface temperature of 1200 degrees F for a minimum of two minutes without bursting. Heat resistance is to be demonstrated.

4. PERFORMANCE CHARACTERISTICS

HYDROSTATIC PRESSURE TEST. **NFPA 1961**, *Standard on Fire Hose (Latest Edition).*
THE HOSE SHALL COMPLY WITH THE , EXCEPT WHERE THIS SPECIFICATION REQUIRES THE STANDARD TO BE EXCEEDED.

DIAMETER	ACCEPTANCE **PRESSURE**	SERVICE **PRESSURE**	KINK PROOF **PRESSURE**	SHORT **BURST PRESSURE**
5"	**450**	**225**	**340**	**675**

FRICTION LOSS. The friction loss characteristics of the hose at 100 psi residual pressure shall ensure that the hose meets the values detailed below.

	FRICTION LOSS					
GPM	**500**	**800**	**1000**	**1250**	**1500**	**2000**
	.84	**2.2**	**3.34**	**5.5**	**7.5**	**13.5**

REPAIRABILITY. Cover damage, punctures and other small holes must be able to be repaired with a vulcanizable patch technique, inside and outside, thereby restoring the hose to full operational use. The hose manufacturer shall provide patches as needed to The District, without cost to The District. The manufacturer shall provide a sample of a patch repair.

TRAINING. The manufacturer to meet the requirements of NFPA Standard 1500, and to meet the requirements of OSHA shall supply training. A certified instructor shall provide training. Certification must be from an accredited state agency. In addition, a training video, outlining all aspects of hose must be provided.

5. QUALITY ASSURANCE PROVISIONS

INSPECTION. Authorized agent from Operations Division shall reserve the right to visit the manufacturing plant during the production phase of the operation at no cost to The District. Hose must be manufactured in the United States.

WARRANTY. Hose provided must be warranted to be free from defects in materials and workmanship for a period of no less than two years. In addition to this standard warranty, hose provided must be warranted against failure due to chemical attack for a period of no less than two years.

DOCUMENTATION. Manufacturer shall have a certified quality control program. Program shall meet the requirements of Mil I 45208, Underwriters Labs Inc. and Factory Mutual Research, Inc.

SAMPLE. The District reserves the right to perform destructive tests to a sample provided. If the sample fails to meet the specifications as stated, costs of such tests will be born by the manufacturer.

6. GENERAL

COUPLINGS. Couplings shall be Storz type, with a three-part collar. Couplings shall have a locking mechanism that conforms to NFPA Standard 1963. Locking mechanism to have a purchase point on both sides of the lock so as not to allow damage when deployed. Couplings shall be guaranteed for the life of the hose. Hose and coupling shall be from the same manufacturer. Couplings with exposed bolts will not be accepted.

COLOR. Hose color shall be matching the Hi-Combat Lite green for improved night visibility, to match existing hose, and to indicate the increased operating pressure of 225 Psi.

STENCIL. Hose to be stenciled with “SACRAMENTO METRO FIRE” in 3” letters.
Hose will be numbered with an eight-digit ID number as provide by The District.

WEIGHT. Weight shall not exceed the following: **5”** **54.5** Average weights for 50 feet coupled.

Shipping Costs. All orders over $5,000 shall be shipped without cost to the District.